

**REMARKS**

Claims 1-20 are pending in the present application. Claims 1-20 have been rejected by the Examiner. By this response, claim 1 has been amended.

Claim 1 has been amended to specify that a non-linear regression is used with a sinusoidal model and digital data points in the time domain to fit the sinusoidal model to the digital data points. Independent claims 8 and 15 already recite fitting the sinusoidal model to the digital data points. Whereas the cited art in Slepicka recites approximating curve fitting to a 'meta-model' in polynomial fashion, the cited art does not teach or reasonably suggest directly fitting the sinusoid to the data.

Claims 1-20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Wake (U.S. Patent Appl. Pub. No. 2002/0100864) in view of Slepicka et al. (Applied Optics article).

Wake discusses a laser imaging apparatus for mammography. Abstract; pg. 1, para. [0002]. The Wake laser system includes a detector used to display a photon-intensity versus time plot, called the Temporal Point Spread Function (TPSF) curve, of a laser pulse transmitted through the breast. Pg. 5, para. [0072]. The earliest arriving photons represented by the portion 111 of the curve are used in image reconstruction. Pg. 5, para. [0072] and Fig. 10. Portion 113 represents photons that are highly scattered and are not used in image reconstruction. Pg. 5, para. [0072] and Fig. 10. The TPSF curve

can be fitted to a diffusion equation to determine optical characteristics of the breast, such as the absorption coefficient, the transport scattering coefficient, and the index of refraction. Pg. 5, para. [0072].

Slepicka discusses a simplified regression method for reducing conventional single-frame interferograms that arise in flow and heat-transfer measurements to evaluate the mechanical properties of solids and fluids. Pg. 5039. In Slepicka, interferometric intensity is measured as  $I(x) = B_e(x) + A_e(x)\cos(P_e(x))$ , where  $B_e(x)$ ,  $A_e(x)$  and  $P_e(x)$  represent *simple approximating functions* for background intensity, modulation amplitude and modulation phase respectively. Pg. 5040. Removing the background estimate from the intensity data results in  $I_s(x) = I(x) - B_e(x) \approx A(x)\cos(P(x))$ . Pg. 5040. Slepicka recites approximating curve fitting to a 'meta-model' in polynomial fashion, rather than directly fitting the sinusoid to the data. Pp. 5040-41.

First, the Applicant submits that neither Wake nor Slepicka teaches or suggests all the limitations of pending claims 1-20 of the present application. For example, neither Wake nor Slepicka teaches or suggests processing digital data points representing a portion of an image signal in the time domain by non-linear regression fitting of a sinusoidal model to the digital data. This limitation is recited in various forms in independent claims 1, 8 and 15 and, thus, in their dependent claims 2-7, 9-14 and 16-20 as well. Additionally, Wake does not disclose nonlinear regression while Slepicka does not disclose optical coherence tomography. Furthermore, neither Wake nor Slepicka

teaches or suggests processing a **portion** of an imaging signal, as recited in independent claims 1, 8 and 15. Rather, both references process a signal as a whole, as illustrated by Fig. 2 of Slepicka, at pg. 5041. Fig. 3, referenced by the Examiner, simply illustrates a plot of phase values versus position. Pg. 5042. Neither Wake nor Slepicka teaches or suggests determining a frequency of an image signal as recited in independent claims 8 and 15 of the present application. Neither Wake nor Slepicka teaches or suggests optimizing a sinusoidal model for a known frequency range, as recited in independent claim 15 of the present application. Rather, as previously discussed, Slepicka discusses approximation and estimation, and Wake similarly lacks any teaching or suggestion of optimization.

Therefore, for at least these reasons, the Applicant submits that claims 1-20 should be allowed over the art of record.

Second, the Applicant respectfully submits that one of ordinary skill in the art of the pending claims would not have thought at the time of invention of the subject matter of the pending claims to combine the laser mammography apparatus of Wake with the flow and heat-transfer approximation system of Slepicka. Combining the two subject matter areas would result in a system that would not function effectively for its intended purpose.

To render a claim obvious, there must be some suggestion or motivation to combine the references. M.P.E.P. § 706.02(j) (May 2004). Additionally, there must be a

reasonable expectation of success. M.P.E.P. § 706.02(j) (May 2004). Finally, the combined references must teach or suggest all the claim limitations. M.P.E.P. § 706.02(j) (May 2004).

The law is well settled that “obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so.” *ACS Hospital Systems, Inc. v. Montfiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929 (Fed. Cir. 1984). Additionally, the Examiner is not permitted to use an improper hindsight reconstruction of the claimed invention in rejecting the claims. Use of hindsight analysis has been specifically condemned by the Federal Circuit:

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification ... Here, the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This Court had previously stated that “one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”

*In Re John Fritch*, 972 F.2d 1260, 23 U.S.P.Q. 2d 1780, 1783 (Fed. Cir. 1992). See also *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1135, 1143 n.5, 229 U.S.P.Q. 182, 187 n.5 (Fed. Cir. 1986); MPEP 2141.

When a prior art reference must be modified to show a claimed invention, the prior art must suggest the modifications in order to make the claims obvious under 35

Application No. 10/672,863  
Attorney Docket No. 15066US01

U.S.C. § 103. *ACS Hospital Systems*, 732 F.2d at 1577. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on the applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q. 2d 1438 (Fed. Cir. 1991).

It is not permissible to pick and choose among the individual elements of assorted prior art references to re-create the claimed invention, but rather "some teaching or suggestion in the references to support their use in the particular claimed combination" is needed. *Symbol Technologies, Inc. v. Opticon, Inc.* 935 F.2d 1569, 1576, 19 U.S.P.Q.2d 1241 (Fed. Cir. 1991). That is, in order to combine two or more prior art references to make claims obvious under 35 U.S.C. § 103, the prior art references must suggest the combination of their teachings. *ACS Hospital Systems*, 732 F.2d at 1577. In *Ex parte Hiyamazi*, the Board of Patent Appeals and Interferences reversed a rejection based on a combination of references, stating, in part:

Under 35 USC § 103, where the Examiner has relied upon the teachings of several references, the test is whether or not the reference viewed individually and collectively would have suggested the claimed invention to the person possessing ordinary skill in the art. Note *In re Kaslow*, 707 F.2d 1366, 107 USPQ 1089 (Fed. Cir. 1983). It is to be noted, however, that citing references which merely indicate the isolated elements and/or features recited in the claims are known is not a sufficient basis for concluding that the combination of claimed references would have been obvious. That is to say, there should be something in the prior art or a convincing line of reasoning in the answer suggesting the desirability of combining the claimed invention. Note *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986).

*Ex parte Hiyamazi*, 10 U.S.P.Q.2d 1393 (Bd. Pat. App. & Interf. 1988).

The law also is very clear that a finding of obviousness can only be premised on prior art references from analogous areas of art and not on art from nonanalogous areas.

Specifically, the Federal Circuit has applied the following two-step test:

The determination that a reference is from a nonanalogous art is therefore twofold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved.

*In re Deminski*, 796 F.2d 436 (Fed. Cir. 1986).

Therefore, the Applicant again submits that claims 1-20 should be allowable over the cited art.

Third, the Applicant respectfully submits that even a hypothetical combination of Wake and Slepicka fails to teach or suggest all of the limitations of claims 1-20 of the present application. For example, as discussed above, the combination of Wake and Slepicka would fail to teach or reasonably suggest analyzing a portion of a signal, as recited in claims 1-20. Additionally, as discussed above, the combination of Wake and Slepicka would fail to teach or suggest using non-linear regression with a sinusoidal model to fit a sinusoid to digital data for a portion of an image signal, rather than to approximate a relationship between the sinusoid and the data. This limitation is recited in claims 1-20. The combination of Wake and Slepicka neither teaches nor suggests determining a frequency of an image signal as recited in independent claims 8 and 15 of the present application. The combination of Wake and Slepicka neither teaches or

suggests optimizing a sinusoidal model for a known frequency range, as recited in independent claim 15 of the present application.

Furthermore, the combination of Wake and Slepicka fails to teach or suggest additional limitations recited in dependent claims of the present application. For example, the combination does not teach or suggest the sinusoidal model equation recited in claims 2, 12 and 18. Rather, Slepicka discloses the approximations discussed above. Similarly, the combination fails to disclose the sinusoidal model recited in claims 3, 13 and 19.

In addition, the combination of Wake and Slepicka fails to teach or suggest optimizing a non-linear regression for a known frequency range, as recited in claims 4 and 10 (and independent claim 15, as described above). Rather, the combination discloses no optimization. The combination also fails to teach or reasonably suggest the elimination of components that fail to converge correctly, as recited in claims 6, 14 and 17. Rather, neither reference in the combination discusses any such elimination. Furthermore, as discussed above, the combination fails to disclose analysis of a portion of the signal. Dependent claims 7, 11 and 16 further refine that portion to be less than a full cycle of a wave of the signal. Thus, the Applicant submits that the combination fails to teach or suggest such a portion. The combination additionally fails to disclose the parameters recited in claims 5 and 20.

Application No. 10/672,863  
Attorney Docket No. 15066US01

Therefore, for at least these reasons, the Applicant submits that independent claims 1, 8 and 15, as well as corresponding dependent claims 2-7, 9-14, and 16-20, should be allowable.



Application No. 10/672,863  
Attorney Docket No. 15066US01

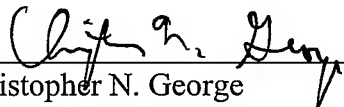
**CONCLUSION**

If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below.

The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of McAndrews, Held & Malloy, Account No. 13-0017.

Respectfully submitted,

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